

REMARKS

Claims 247-257 have been cancelled. Claims 258-275 have been added. No new matter has been added.

The invention as recited in independent claim 258 reads on the invention elected by applicant in applicant's Response to Election/Restriction Requirement dated January 7, 2003 (wherein applicant elected Specie 1). The Response of January 7, 2003 was in response to the Election/Restrictions Office Action of August 7, 2002. Referring to the Election/Restrictions Office Action of August 7, 2002 it is seen that Specie 1 as described explicitly references Figures 1 through 6 of applicant's application as filed (see words "as shown in Figs. 1-6" on page 2 of said Election/Restrictions Office Action of August 7, 2002).

Figure 5C of applicant's application shows opening 172 in a first dielectric material 124,126. The opening 172 has sidewall surface 126s. Figure 5G shows conductive material 130a, 130b lining the sidewall surface of opening 172. Figure 5H shows a second dielectric material 140 formed over the conductive material 130a, 130b within the opening 172.

Hence, the limitations of independent claim 258 read on Specie 1 and claim 258 is directed to an elected invention.

Likewise, the invention as recited in claim 269 also reads on Specie 1 as described in the Election/Restrictions Office Action of August 7, 2002. Figure 5N shows conductive sidewall spacers 130a,b between first dielectric material 124, 126 and second dielectric material 140. Hence, claim 269 is directed to the elected invention.

CLAIM REJECTIONS UNDER 35 USC 112, 102 AND 103

PARAGRAPHS 2-12 OF OFFICE ACTION OF APRIL 9, 2003

In view of the cancellation of claims 178-246 in the Response of October 9, 2003, the claim objections under 35 USC 112 (paragraphs 2 and 3 of Office Action of April 9, 2003), 35 USC 102 (paragraphs 5, 6, 7 and 9 of the Office Action of April 9, 2003), 35 USC 103 (paragraphs 11 and 12 of the Office Action of April 9, 2003) have been overcome and applicant requests they be removed.

DOUBLE PATENTING

PARAGRAPHS 13-14 OF OFFICE ACTION OF APRIL 9, 2003

A terminal disclaimer was provided in applicant's Response dated October 9, 2003.

CLAIMS 247-257

Claims 247-257 were withdrawn from consideration as being directed to a non-elected invention. These claims have been canceled by the applicant.

ANALYSIS OF NEW INDEPENDENT CLAIM 258 WITH REGARD TO CITED REFERENCES

Gonzalez (US 5,854,102)

Gonzalez (Fig. 8) discloses a memory element that includes plug 38 of polysilicon. The plug 38 of polysilicon is disposed in trench 24. Trench 24 is formed in insulation layer 20 (see Figures 4, 5 and 6 of Gonzalez).

Gonzalez does not show a second dielectric material formed over the plug 38 within the trench 24. Hence, Gonzalez provides no teaching or suggestion of "a second dielectric material formed over said conductive material within said opening" as claimed by applicant in new claim 258.

Doan (US 6,423,621)

Doan (Fig. 14) is directed to a method of forming a memory element wherein the lower electrode includes a tip (114) protruding toward the memory material. However, Doan fails to teach or suggest the following limitations:

a first dielectric material having an opening;
a conductive material lining the sidewall surface
of said opening;
a second dielectric material formed over said
conductive material within said opening

Hence, Doan fails to teach or suggest applicant's invention as recited in claim 258.

Ovshinsky (US 5,687,112)

Ovshinsky '112 (Figs. 1 and 2) is directed to an electrical contact that tapers to a peak adjacent to a memory material.

Neither conductive layer 14, conductive layer 34, nor conductive layer (14, 34) line the sidewall surface of an opening. In addition, Ovshinsky '112 fails to teach or suggest the limitations:

a first dielectric material having an opening;
a conductive material lining the sidewall surface of said opening;
a second dielectric material formed over said conductive material within said opening;

Hence, Ovshinsky '112 fails to teach or suggest all of the limitations of claim 258 and Ovshinsky '112 fails to anticipate claim 258 of applicant's invention.

Ovshinsky (5,414,271)

Ovshinsky '271 (Fig. 1) shows conductive layer 32, 34 formed on the sidewall surface of aperture 22 of SiO₂ layer 22. A layer 36 of chalcogenide is deposited over the conductive layer 32, 34. Ovshinsky fails to teach or suggest the limitation "a second dielectric material formed over said conductive material within said opening" as recited in independent claim 258.

Hence, Ovshinsky fails to teach or suggest all of the limitations of claim 258 and Ovshinsky '271 does not anticipate claim 258.

In view of the above remarks, each of the references Gonzalez, Doan, Ovshinsky '112 and Ovshinsky '271, either alone or in combination, fails to teach or suggest the

limitations of applicant's new independent claims 258. Claims 259-268 depend from claim 258. Hence, the cited references fail to teach or suggest all of the limitations of any of the dependent claims.

ANALYSIS OF NEW INDEPENDENT CLAIM 269 WITH REGARD TO CITED REFERENCES

Claim 269 recites:

A memory element, comprising:

a conductive sidewall spacer between a first dielectric material and a second dielectric material; and
a programmable resistance material in electrical communication with said conductive sidewall spacer.

The terms "*sidewall spacer*" and "*conductive sidewall spacer*" are well-known in the semiconductor arts. An example of the use of the terms "*sidewall spacer*" and "*conductive sidewall spacer*" is provided in U.S. Patent Number 6,420,749 on column 4, line 11 and column 6, lines 17-28. Another example is provided in U.S. Patent Number 6,642,570 on column 4, lines 33-39 and column 6, line 6. These patents are included as Exhibits 1 and 2 at the end of this response. Exhibits 1 and 2 illustrate that the terms "*sidewall spacer*" and "*conductive sidewall spacer*" are well-known in the semiconductor arts and used to denote a particular type of element.

It is respectfully noted that none of the references provided in the Office Action dated April 9, 2003 provide any teaching or suggestion of conductive sidewall spacers.

Gonzalez (US 5,854,102)

Gonzalez (Fig. 8) discloses a memory element that includes plug 38 of polysilicon. The plug 38 is not a conductive sidewall spacer and is structurally different from a conductive sidewall spacer. Gonzalez provides no teaching or suggestion of conductive sidewall spacers and Gonzalez fails to anticipate applicant's independent claim 269.

Doan (US 6,423,621)

Doan (Fig. 14) is directed to a method of forming a memory element wherein the lower electrode includes a tip (114) protruding toward the memory material. The tip 114 is not a conductive sidewall spacer and is structurally different from a conductive sidewall spacer. Doan provides no teaching or suggestion of conductive sidewall spacers and Doan fails to anticipate applicant's independent claim 269.

Ovshinsky (US 5,687,112)

Ovshinsky '112 (Figs. 1 and 2) is directed to an electrical contact that tapers to a peak adjacent to a memory material. Referring to Figs. 1 and 2, neither layer 14, layer 34, nor layer (34,14) are conductive sidewall spacers and are each structurally different from a conductive sidewall spacer. Ovshinsky '112 provides no teaching or suggestion of conductive sidewall spacers and fails to anticipate applicant's independent claim 269.

Ovshinsky (5,414,271)

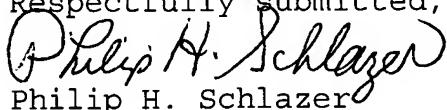
Ovshinsky '271 (Fig. 1) shows conductive layer 32, 34 formed on the sidewall surface of aperture 22 of SiO₂ layer 22. Conductive layer 32, 34 is not a conductive sidewall spacer and is structurally different from a conductive sidewall spacer. In addition, Figure 1 of Ovshinsky '271 shows chalcogenide layer 36 formed over layer 32,34. Hence,

Ovshinsky '271 fails to teach or suggest the limitations of applicant's claim 269 and thus does not anticipate claim 269.

In view of the above remarks, each of the references Gonzalez, Doan, Ovshinsky '112 and Ovshinsky '271, either alone or in combination, fails to teach or suggest the limitations of applicant's new independent claims 269. Claims 270-275 depend from claim 269. Hence, the cited references fail to teach or suggest all of the limitations of any of the dependent claims.

SUMMARY

Claims 247-257 have been cancelled and claims 258-275 have been added. As noted above, new claims 258-275 are directed to the elected invention. Applicant respectfully requests reconsideration, withdrawal of the outstanding rejections, and notifications of allowance. Should the Examiner have any questions or suggestions regarding the prosecution of this application, he is asked to contact applicant's representative at the telephone number listed below.

Respectfully submitted,

Philip H. Schlazer

Reg. No. 42,127

Date: 9 March 2004
Energy Conversion Devices
2956 Waterview Drive
Rochester Hills, MI 48309

Phone (248) 293-0440 extension 6260
Fax (248) 844-2273